



# Synthetic Biology

Synthetic biologists experiment with DNA and program cells to create custom-made organisms for their clients.

## What happens in the market

Grown in labs modified organisms streamline the production of perfumes, beverages, pesticides, and laundry detergent. For example, the extraction of rose oil from rose petals is expensive, but if you add the right genes to a yeast cell, you can get the real oil.

In the near future, synthetic biology will allow us to produce biofuel from algae, electricity from bacteria, create new diagnostic medication and synthetic vaccines, and make more products and materials that reduce environmental impacts.

SynBio technologies have applications across multiple sectors, from the health industry to the foods, agriculture industry and ecology. SynBio has found a major and vast application in medicine. Synthetic organisms are used to create next-generation antibiotics and artificial tissues. In the coming years, synthetic biology will increasingly focus on the development of new antimicrobial drugs and synthetic vaccines.

The potential of synthetic biology is comparable to the most progressive industries such as artificial intelligence or food tech. In the future synthetic biology will be capable of creating a technological boom comparable to the effects of the Internet and social media.

## Why this industry will grow

The synthetic biology market is projected to reach \$19.8B by 2025 from \$6.8B in 2020, at a CAGR of 23.9% and here's why.

**Growing demand for synthetic genes and cells.** In 2019, gene synthesis accounted for the largest share of the SynBio market. Synthetic DNA is increasingly being used in various industries and genome engineering – it makes genome editing easier.

**Synthetic biology has a wide range of applications.** The creation of new biological systems has almost unlimited applications in agriculture, medicine and manufacturing industries.

For example, it will be possible to synthesize environmentally-friendly chemicals from microbes, which in the future will completely replace petrochemicals. Crops grown in synthetic biology labs will be more resistant to diseases and allow farmers to use their lands more sustainably.

**Reduced cost of DNA synthesis and sequencing.** Synthetic DNA is the raw material for creating artificial life. In recent years, advances in DNA synthesis have resulted in a steep drop in price from \$4 to a few cents per base pair. Competitive prices allow companies to serve more end-users and increase their market share.

**More powerful technologies.** CRISPR-Cas technology allows scientists to edit genes quickly and cheaply, in days rather than weeks or months. This powerful new tool can control genes with more precision than ever before. While artificial intelligence and machine learning help fine-tune the design of new organisms even faster.

**Growing R&D funding and investments.** Research in pharmaceuticals, synthetic vaccines, alternative fuels, textiles, and environmentally friendly chemicals is expected to grow in the coming years.

## Stocks to watch in the future

### Public Companies

#### Thermo Fisher Scientific · TMO

A world leader in serving science with \$25B in sales and 75,000 employees in 50 countries. It delivers innovative technologies, purchasing convenience and pharmaceutical services.

#### Agilent Technologies · A

Provides analytical instruments, software, services and consumables for the entire laboratory workflow, as well as chemical analysis equipment.

#### Zymergen · ZY

Zymergen manipulates genetic material and cellular processes to make novel molecules. Such molecules create superior materials that are less expensive, better performing, and more accessible than those produced via traditional methods in manufacturing, transportation, and other applications, while simultaneously reducing the environmental pollution.

Honorable mentions: Merck KGaA (MRK), Amyris (AMRS), Precigen (PGEN), GenScript Biotech, Twist Bioscience (TWST), Codexis (CDXS), Eurofins Scientific (ERF).

### Private Companies

#### Ginkgo Bioworks

A new lab that uses robotic systems to make an assembly line for churning out exotic life forms. The company experiments with DNA and programs cells to create custom-made organisms for their clients. The synthetic organisms manufactured by Ginkgo Bioworks are used in a wide range of industrial and pharmaceutical applications.

Ginkgo partnered with Bayer to work on the plant microbiome to make nitrogen fertilizer available for plants. It creates protein replacements with Motif Foodworks and produces cultured cannabinoids with Cronos. This business model allows the company to scale up and create multiple growth opportunities in the future.

The company is expected to become public through a merger with Soaring Eagle Acquisition Corp in Q3 2021.

Honorable mentions – Biotechnology, ATUM, TeselaGen, Arzeda, Integrated DNA Technologies, New England Biolabs.